

## FORAGE SUITABILITY GROUP

### Sand

**FSG No.:** G102BY300SD

**Major Land Resource Area:** 102B - Till Plains

#### Physiographic Features

The soils in this group are found on uplands, stream terraces, and flood plains.

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	980	1640
<b>Slope (percent):</b>	0	11
<b>Flooding:</b>		
<b>Frequency:</b>	None	Frequent
<b>Duration:</b>	None	Brief
<b>Ponding:</b>		
<b>Depth (inches):</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Runoff Class:</b>	Negligible	Low

#### Climatic Features

Annual precipitation varies widely from year to year in MLRA 102B. Average annual precipitation for all climate stations listed below is about 24 inches. Over 75 percent of that occurs during the months of April through September. On average, there are about 30 days with greater than .1 inches of precipitation during the same timeframe.

Average annual snowfall ranges from 25 to 39 inches across the MLRA. Snow cover at depths greater than 1 inch range from 15 days at Bridgewater to 79 days at Madison.

Average July temperatures are about 75°F and average January temperatures are about 15°F. Recorded temperature extremes in the MLRA are a low of -36 degrees and a high of 110 degrees both recorded at Sioux Falls.

Average annual wind speeds at Sioux Falls are 11 mph with the highest wind speeds occurring during March and April. It is cloudy an average of 157 days a year at Sioux Falls, with the greatest incidence of cloudy weather occurring in November and December. Average morning relative humidity in June is 82 percent and average afternoon humidity is 59 percent.

The climate data listed in the tables below represent high and low ranges and averages for the climate stations and dates listed. For additional climate data, access the National Water and Climate Center at

<http://www.wcc.nrcs.usda.gov>.

	<b>From</b>	<b>To</b>
<b>Freeze-free period (28 deg)(days):</b> (9 years in 10 at least)	139	154
<b>Last Killing Freeze in Spring (28 deg):</b> (1 year in 10 later than)	May 13	May 03
<b>Last Frost in Spring (32 deg):</b> (1 year in 10 later than)	May 24	May 17
<b>First Frost in Fall (32 deg):</b> (1 year in 10 earlier than)	Sep 10	Sep 19
<b>First Killing Freeze in Fall (28 deg):</b> (1 year in 10 earlier than)	Sep 19	Sep 30
<b>Length of Growing Season (32 deg)(days):</b> (9 years in 10 at least)	117	133
<b>Growing Degree Days (40 deg):</b>	4565	5314
<b>Growing Degree Days (50 deg):</b>	2600	3179

	<b>From</b>	<b>To</b>
<b>Annual Minimum Temperature:</b>	-25	-20
<b>Mean annual precipitation (inches):</b>	23	25

**Monthly precipitation (inches) and temperature (F):**

<b>2 years in 10:</b>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
Precip. Less Than	0.13	0.19	0.63	1.12	1.56	1.86	1.71	1.47	1.33	0.71	0.20	0.26
Precip. More Than	0.73	1.35	2.33	3.33	4.79	5.83	4.96	4.17	3.71	2.66	1.63	1.04
<b>Monthly Average:</b>	0.47	0.62	1.64	2.36	3.26	3.70	3.17	2.80	2.62	1.66	1.04	0.67
<b>Temp. Min.</b>	2.1	8.2	20.8	34.5	45.9	55.5	60.8	57.9	48.3	36.5	22.5	8.0
<b>Temp. Max.</b>	29.9	35.8	48.2	64.6	75.4	84.7	89.3	86.3	78.1	66.3	48.0	32.9
<b>Temp. Avg.</b>	15.1	21.3	33.5	48.1	59.9	69.4	74.7	71.9	62.2	50.2	34.2	19.7

<u>Climate Station</u>	<u>Location</u>	<u>From</u>	<u>To</u>
SD1032	Bridgewater, SD	1961	1990
SD1392	Canton, SD	1961	1990
SD1579	Centerville, SD	1961	1990
SD5090	Madison Research Farm, SD	1962	1990
SD5228	Marion, SD	1961	1990
SD5481	Menno, SD	1961	1990
SD7667	Sioux Falls, SD	1961	1990
SD8472	Tyndall, SD	1961	1990
SD8622	Vermillion, SD	1961	1990
SD9502	Yankton, SD	1961	1990

**Soil Interpretations**

This group consists of well to excessively drained, coarse textured soils formed in sandy materials deposited by wind or water. Permeability is moderate to rapid. Those that are moderately permeable are sand overlying finer textured subsoil.

<b>Drainage Class:</b>	Well drained	To	Excessively drained
<b>Permeability Class:</b>	Moderate	To	Rapid
(0 - 40 inches)			
<b>Frost Action Class:</b>	Low	To	Low

	<u>Minimum</u>	<u>Maximum</u>
<b>Depth:</b>	72	
<b>Surface Fragments &gt;3" (% Cover):</b>	0	3
<b>Organic Matter (percent):</b>	0.5	2.0
(surface layer)		
<b>Electrical Conductivity (mmhos/cm):</b>	0	0
(0 - 24 inches)		
<b>Sodium Absorption Ratio:</b>	0	0
(0 - 12 inches)		
<b>Soil Reaction (1:1) Water (pH):</b>	5.6	8.4
(0 - 12 inches)		
<b>Available Water Capacity (inches):</b>	4	8
(0 - 60 inches)		
<b>Calcium Carbonate Equivalent (percent):</b>	0	8
(0 - 12 inches)		

**Adapted Species List**

The following forage species are considered adapted to grow on the soils in this group. Additional information concerning plant characteristics of a number of the listed species as well as individual cultivars of many of those species can be accessed at <http://plants.usda.gov/>.

<u>Cool Season Grasses</u>	<u>Dryland</u>	<u>Irrigated</u>
Intermediate wheatgrass	F	G
Meadow brome	NS	G
Orchardgrass	NS	G
Pubescent wheatgrass	F	G
Smooth brome	F	G
Tall fescue	F	F
Timothy	NS	F
Western wheatgrass	F	NS

<u>Warm Season Grasses</u>	<u>Dryland</u>	<u>Irrigated</u>
Big bluestem	G	G
Indiangrass	G	G
Little bluestem	G	NS
Prairie sandreed	G	NS
Sand bluestem	G	NS
Sand lovegrass	F	NS
Sideoats grama	F	NS
Switchgrass	G	G

<u>Legumes</u>	<u>Dryland</u>	<u>Irrigated</u>
Alfalfa	G	G
Birdsfoot trefoil	NS	G
Cicer milkvetch	F	F
Purple prairieclover	F	NS
Red clover	NS	G

G - Good adaptation for forage production on this group of soils in this MLRA

F - Fair adaptation but will not produce at its highest potential

NS - Not suited

### Production Estimates

Production estimates listed here should only be used for making general management recommendations. Onsite production information should always be used for making detailed planning and management recommendations.

The high forage production estimates listed below are based on dense, vigorous stands of climatically adapted, superior performing cultivars. They are properly fertilized for high yields, and pest infestations are kept below economic thresholds. Mechanical harvests are managed to maintain stand life by cutting at appropriate stages of maturity and harvest intervals. If grazed, optimum beginning and ending grazing heights are adhered to. Adequate time is allowed for plant recovery before entering winter dormancy under both uses.

The production estimates listed below represent total annual above ground plant production on an air-dry-matter basis. Estimates of hay and grazing yields can be calculated from these numbers by multiplying them by a harvest efficiency. A 70 percent harvest efficiency is commonly used when converting to hay yields. Pasture harvest efficiency is highly dependent on the grazing management system applied, ranging from 25 to 50 percent.

Forage Crop	Management Intensity		Management Intensity	
	<u>High</u>	<u>Low</u>	<u>High</u>	<u>Low</u>
	(lbs/ac)	(lbs/ac)	(lbs/ac)	(lbs/ac)
Alfalfa	6600	3300		
Alfalfa/Intermediate wheatgrass	5100	2800	14300	8600
Alfalfa/Smooth brome	5100	2800	14300	8600
Indiangrass	4800	2900		
Intermediate wheatgrass	4300	2600	11400	6900
Sand bluestem	6300	3700		
Smooth brome	4300	2600	11400	6900

**Forage Growth Curves**

Growth curves estimate the seasonal distribution of growth of the various forage crops. They indicate when the forages may be available for grazing or mechanical harvest.

**Growth Curve Number:** SD0001  
**Growth Curve Name:** Alfalfa  
**Growth Curve Description:** Alfalfa, MLRAs 107, 102B, 63B, 66, 65

**Percent Production by Month**

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	5	30	25	20	15	5	0	0	0

**Growth Curve Number:** SD0004  
**Growth Curve Name:** Cool season grass  
**Growth Curve Description:** Cool season grass, statewide

**Percent Production by Month**

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	10	40	30	10	5	5	0	0	0

**Growth Curve Number:** SD0005  
**Growth Curve Name:** Warm season grass  
**Growth Curve Description:** Warm season grass, statewide

**Percent Production by Month**

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	0	10	40	35	15	0	0	0	0

**Growth Curve Number:** SD0003  
**Growth Curve Name:** Irrigated Alfalfa  
**Growth Curve Description:** Irrigated Alfalfa, statewide

**Percent Production by Month**

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	5	25	25	20	15	10	0	0	0

**Soil Limitations**

Soil blowing is a severe hazard during stand establishment or renovation of forage stands on the soils of this group. Bare areas where livestock concentrate are also susceptible. Production potential is low to moderate due to the low available water capacity and droughtiness of these soils. Also, these soils are typically low in native fertility and have reduced capacity to supply plant nutrients. Species choices are somewhat limited for pasture and hayland for these same reasons.

**Management Interpretations**

The impact on yields of the low to moderate available water capacity of these soils can be reduced by selecting forage species that are highly tolerant to periods of drought and inadequate soil moisture and can grow on coarse soils. Incorporate wind erosion control practices during stand establishment. Properly locating facilitating practices such as fences, lanes, and water developments can help control livestock movement, reduce trailing perpendicular to steeper slopes, evenly distribute grazing pressure, and reduce bare areas.

**FSG Documentation****Similar FSGs:****FSG ID**      **FSG Narrative**

G102BY130S      Very Droughty Loam soils have finer textures than sands.

### **Inventory Data References**

Agriculture Handbook 296-Land Resource Regions and Major Land Resource Areas  
Natural Resources Conservation Service (NRCS) National Water and Climate Center data  
USDA Plant Hardiness Zone Maps  
National Soil Survey Information System (NASIS) for soil surveys in South Dakota counties in MLRA 102B  
South Dakota NRCS South Dakota Technical Guide  
NRCS National Range and Pasture Handbook  
Various Agricultural Research Service, Cooperative Extension Service, and NRCS research trials for plant adaptation and production.

### **State Correlation**

This site has been correlated with the following states: South Dakota

### **Forage Suitability Group Approval**

**Original Author:** Tim Nordquist

**Original Date:**

**Approval By:** Dave Schmidt

**Approval Date:** 1/9/03